Fishery Management Plan

Spider Chain of Lakes
Sawyer County, Wisconsin

Nov. 28, 2022

Prepared by:

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FOREWORD AND ACKNOWLEDGMENTS

This long-term strategic plan will guide our fishery management efforts on Big Spider, Little Spider, Fawn and Clear lakes (collectively referred to in this plan as “The Spider Chain”) for many years to come. We will also include some consideration of North Lake, though there has historically been less fisheries management of that lake given the somewhat limited public access opportunities. We believe our fishery management plans should be based upon a shared vision developed by combining broad-based survey information from statewide anglers and interactive input from local stakeholders. From those sources, we determine user preferences based on ecosystem capability. We believe the goals of a good plan must reflect the shared vision between users and managers, and measurable objectives must be set so we know whether selected strategies are succeeding or failing. We believe in making good tries and learning from failure. Part of that process involves amending strategic plans (like this document) when failure dictates that we either develop more realistic objectives or change our strategies to achieve reasonable objectives. This plan should be updated as needed in the decades that follow.

We call this a “long-term strategic plan” because the goals and objectives are relatively timeless. Specific actions are outlined, but timelines and most details for how and when those actions will be accomplished are not rigid. Each year will bring its own fiscal constraints and operational priorities, so we must remain flexible in our implementation of proposed actions. We will do our best to justify actions we believe necessary to realize our shared vision to Wisconsin Department of Natural Resources (DNR) leaders and the general public as time and circumstances permit. We promise to consult this plan at least once annually as we allocate our time and resources to the many important projects before us.

We want to thank the Spider Lake Association for their assistance organizing and advertising the public feedback session and online survey. While we stress that these waterbodies belong to all people, whether property owners or not, partner groups are critical in undertaking the large, meaningful projects needed to advance effective fisheries management.

We also want to thank the 24 stakeholders who gave us an evening of their time in order to help us develop the vision that forms the backbone of this plan. An additional 114 people offered input through an online survey, which was also appreciated and useful. We are very pleased to incorporate all input at this appropriate stage in the planning process and we look forward to continued support for the actions we believe will be necessary to achieve the shared vision. We can settle for nothing less in an area where the quality of fishing means so much to our livelihoods and our quality of life.

-- Max Wolter and the Hayward DNR Fish Team

BACKGROUND

PHYSICAL DESCRIPTION OF WATERS

The Spider Chain of lakes is made up of Big Spider (710 acres), Little Spider (410 acres), Clear (299 acres), Fawn (23 acres) and North (129 acres) lakes. Big, Little, Clear and Fawn are all connected by short, navigable channels. Access to North Lake by boat is more difficult due to a low-clearance bridge which limits some types of watercraft. These lakes sit at the upper end of the Chief River watershed (3,748 total watershed acres), which lies within the Chippewa River drainage. There are no major direct tributary streams to the lakes in the Spider Chain. The lakes are fed with groundwater and diffuse inputs from the abundant wetlands surrounding the chain. Water from Spider Chain flows downstream to the Tiger Cat Chain of lakes. There are state-owned islands in Big, Little and Clear lakes that offer day-use opportunities. There are also several privately owned islands in Big Spider.

The dam that regulates the water level of the Spider Chain is located on the south end of Little Spider Lake (Figure 1). The outflow from the dam is called Spider Creek, which was a seasonal fish refuge from the dam to Highway 77 for many years (the refuge status was removed in 2011). The dam is in private ownership. There is no electricity generated at this dam, so it is not regulated by the Federal Energy Regulatory Commission (FERC).

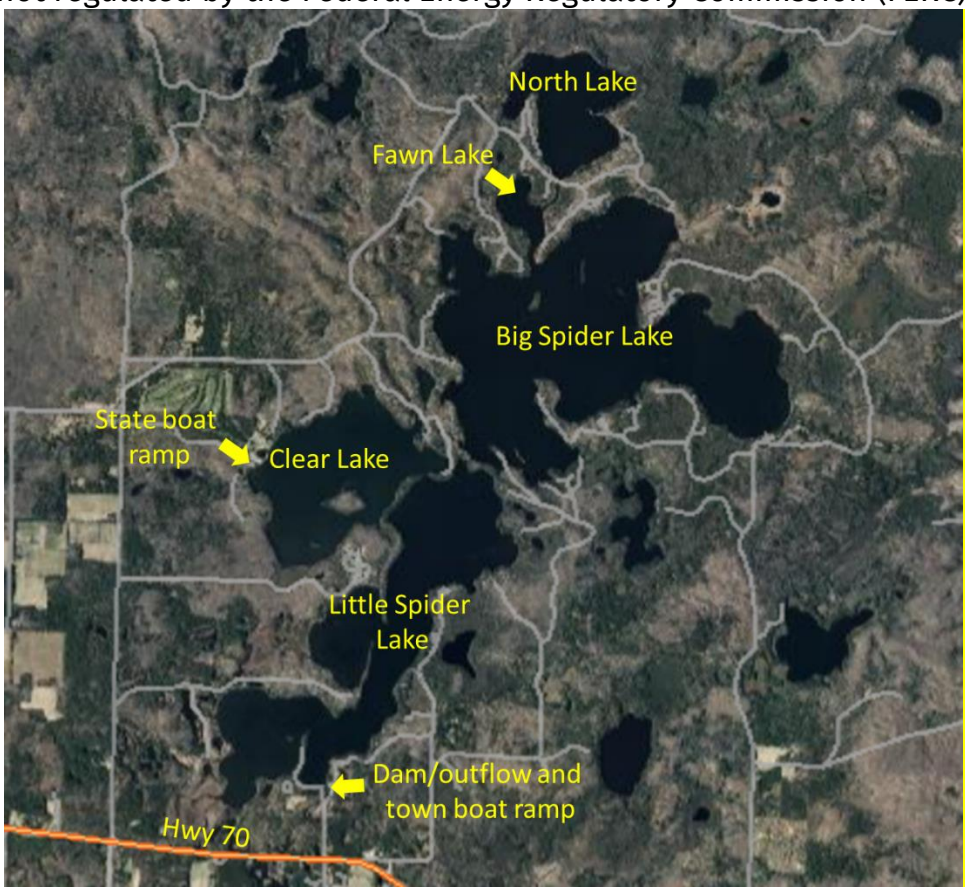


Figure 1. *Map of lakes in the Spider Chain with dam and boat landings highlighted.*

HABITAT CHARACTERISTICS AND PRODUCTIVITY

As a whole, the Spider Chain has an average depth of 14 feet and a maximum depth of 64 feet (Table 1). The bottom substrate consists primarily of muck and rock with stretches of sand and gravel. The watershed consists of 38% forest and 19% wetland, with an additional 36% being surface waters (lakes). Only 2% of the watershed is agriculture, and 5% is developed (Midwest Glacial Lakes Conservation Planner).

Water quality in the Spider Chain is good, and there are no apparent issues that would limit fishery health. Water clarity has remained consistent through time, with around 10 feet of Secchi Disk visibility, on average. Nutrient loading does not appear to be a concern as Trophic State Index values have been steady. Dissolved oxygen is often limited below the thermocline in late summer months, based on temperature/dissolved oxygen profiles recorded by volunteer water quality monitors. However, this is common for lakes in this area. Winterkill has been an issue, particularly in North Lake.

Table 1. *Physical characteristics and most current (year in parentheses) limnological parameters for the Spider Chain in Sawyer County. Values are from Big Spider unless otherwise noted.*

PHYSICAL CHARACTERISTICS	VALUE
Surface Area	1,606 - all lakes
Maximum Depth	64 feet
Mean Depth	14 feet - Big, Little, and Clear lakes
Shoreline Distance	26.14 miles - all lakes
CHEMISTRY AND PRODUCTIVITY	
Total Alkalinity	49.0 mg/l (2020)
pH	7.4 (2002)
Total Phosphorus	10.6 µg/l (2021)
Chlorophyll *a* (July)	3.9 µg/l (2021)
Total Nitrogen	0.45 mg/l (2020)
Secchi Disk Visibility	9-12 feet (2019-2021)
Trophic State Index	Ranges from 40-50 (2021) – classed as mesotrophic/borderline eutrophic

LAKES CLASSIFICATION

In 2019, a new system for Wisconsin Lakes classification was developed. Rypel et al. (2019) analyzed 5,950 lakes statewide and grouped them into 15 lake classes. Lakes were grouped by fish communities, physical characteristics and water quality.

Lakes within the Spider Chain fall into two separate classifications. Big, Little and Clear lakes are considered “complex-cool-clear” lakes, while North and Fawn lakes are considered “complex-cool-dark” lakes. “Complex” means a lake has four or more species of

gamefish, and “cool” means it is projected to have cooler water temperatures more often (below 50°F). “Clear” or “dark” indicates whether the water is more or less turbid compared to the baseline for temperate lakes (Rypel et al. 2019). For the purposes of this plan, we will treat the Spider Chain as a complex-cool-clear system since that classification applies to most of the water, but understanding the differences among the lakes may be useful for interpreting data and setting objectives. Goals and objectives developed for each species in this plan were selected based on what is commonly observed for fisheries within the same lake class and taking into consideration what has historically been observed in the Spider Chain (see Appendix A for more context on the objectives in this plan). This approach will provide more realistic expectations that objectives can be met, given the biological potential of the lakes.

AQUATIC COMMUNITY OVERVIEW

Rooted aquatic vegetative growth is common throughout the chain, with vegetation being abundant in areas with muck bottom and sparser where substrates are predominantly rock or sand. Plants may also be absent in areas with highly flocculent muck, where it can be difficult for plants to effectively take root. Plant surveys have found 77.3% of the littoral area (an area shallow enough for light penetration and plant growth) to support diverse plant growth, evidenced by a species richness count of 57 (Spider Lake Aquatic Plant Management Plan 2013).

Invasive species present in the system include curlyleaf pondweed (*Potamogeton crispus*) and purple loosetrife (*Lythrum salicaria*). Both are actively monitored, and a biological control program has been established for purple loosestrife. Northern Pike (*Esox lucius*) could be considered an introduced species, as pike are not believed to be native to the Chief River drainage (discussed in more detail on page 31).

The lakes support a variety of wildlife including shorebirds, furbearers, ducks, geese, loons, turtles, crayfish and amphibians.

HUMAN DEVELOPMENT AND PUBLIC ACCESS

There are an estimated 241 individual-developed residences and businesses with platted access to the shoreline of the lakes in the Spider Chain, according to the Sawyer County online platting resource (November 2021). Undoubtedly, there are more off-water residences that have some form of shoreline access through an easement or common use area that are not included in that figure. There is an average of 9.2 residences and businesses per mile of shoreline, which is relatively light development in comparison to many other lakes in the area (the average for other large Sawyer County lakes is 17 residences/businesses per mile). Most undeveloped areas are simply unsuitable for building, being either low-lying or steep-banked. Businesses on the water include a golf course, a summer camp and two resorts/lodges. Resorts were considerably more abundant in the past. Many former resort cabins have been sold as individual cabins or condos. Very little of the shoreline (<1%) is formally protected from development via public ownership or

conservation easement, apart from the state-owned islands and state and township access points.

There are two public boat ramps that serve the Spider Chain: a town ramp off Heinemann Road and a state ramp off West Elaine Drive. The state ramp includes paved designated parking spaces, a concrete ramp and a loading/unloading pier. There are three additional platted access points around the chain that are not developed. During this planning process, we asked stakeholders, "Do you feel access (quality of boat ramps, amount of parking, etc.) to the Spider Chain is sufficient to meet your needs for fishing and other recreation?". Responses to that question found 97% thought access was sufficient (some commented that they felt there was *too much* access, usually citing invasive species concerns).

FISH HABITAT

Structural fish habitat in the Spider Chain is diverse, consisting of a mix of weedy bays, rocky points and islands, deep holes and shoreline wood. While the shorelines are developed in most areas, the overall aesthetic is relatively wild throughout much of the chain, including many intact stands of mature trees. Fortunately, some of the most ideal spawning bays for Muskellunge (*Esox masquinongy*) are in low-lying or boggy areas where further development is not feasible, creating an unofficial form of shoreline protection around these sensitive habitats.

The perception is that shoreline woody habitat is moderately abundant relative to other lakes in the area, with concentrations primarily along undeveloped shorelines where trees are allowed to fall naturally into the water. However, almost all lakes in the area, including those of the Spider Chain, have less shoreline woody habitat than historic levels and can benefit from additions of this habitat type (including leaving trees when they fall naturally). A tree drop project was conducted on the shoreline of the state-owned island in Clear Lake in 2020. Around 45 trees were selected and dropped as fish habitat. A recent survey of shoreline woody habitat in the Spider Chain is not available and should be conducted at the next available opportunity (PARTNER OPPORTUNITY). Data from this survey can be used to design future habitat projects and provide a baseline measure of woody habitat. Fish cribs were added to Big Spider in the 1990s, and it is highly likely cribs have been added at other times as well as a part of unofficial/unreported projects. Cribs should not be expected to deliver the same ecological benefits of shoreline wood, and future crib projects will not be a recommendation of this plan.

A sensitive areas designation survey was conducted in 2002-03 on the Spider Chain. This effort designated 32 areas as sensitive habitats and offered management recommendations for the protection of these areas and the larger aquatic community. The sensitive areas report is available on the Wisconsin Department of Natural Resources (DNR) website.

HISTORICAL PERSPECTIVE ON THE FISHERY AND PAST MANAGEMENT

On Jan. 12, 2022, DNR representatives Max Wolter, Scott Braden and Evan Sniadajewski met (via Zoom) with 24 local stakeholders who were willing to volunteer their time to help develop a long-term vision for the fisheries of the Spider Chain in Sawyer County. The DNR staff served as technical advisors to the group, presenting data on past fishery dynamics, current fisheries status, and general habitat characteristics. This was a lively and productive meeting where the attendees' passion for preserving the character and quality of the Spider Lake Chain fishery was evident. Two major themes emerged from this meeting: habitat and managing the introduced Northern Pike population to minimize the impacts on Muskellunge. While attendees were quick to propose potential solutions to these problems, it was also understood and generally agreed that professional fishery managers would select the most appropriate strategies once goals and objectives had been developed, with help from local stakeholders, and adjusted to incorporate what is known about statewide angler preference and the capacity of these lakes to produce what is desired. This mirrored the process by which other Sawyer County fishery management plans have been developed.

An online feedback option was included as part of this planning process. The survey was designed to obtain the same type of feedback given at the in-person session and was administered through SurveyMonkey. The survey was activated on Jan. 13, 2022, the day after the in-person session, and remained open until Feb. 14, 2022 (32 days). The link to the online survey was distributed through DNR and lake association email distribution lists, included in a local newspaper article, and posted online to various social media sites. Questions were designed to obtain information on angler preferences for different fishing experiences and management directions. Additional questions were added to obtain information on attitudes toward the introduced Northern Pike population and access. We received 114 responses via the online feedback option, which provided excellent detail on Spider Chain angler preferences and complemented the discussion from the Zoom meeting. Like the Zoom meeting, the online option allowed us to capture feedback from both Wisconsin resident (42% of those responding) and non-resident (58%) stakeholders. We assume many of these non-residents are seasonal lakeshore owners, resort guests or anglers who come to the Spider Chain to fish for short periods of time.

Detailed results of the online feedback option appear in Appendix B. Feedback received from the Zoom session and online option were generally similar, providing confidence that this combined effort accurately captured the sentiment of the diverse angling community that enjoys this chain.

Muskellunge were the top species of interest for Spider Lake stakeholders based on the online survey and the focus of conversation in the Zoom meeting. This is the first time Muskellunge were the top-ranked species to come out of this process for a Sawyer County lake, highlighting the unique importance of this species to Spider Lake anglers. Significant concern exists for the future of this fishery, with many stakeholders noting decreased fishing success for Muskellunge in recent years. These perceived declines have corresponded with increasing abundance and angler catch rate of Northern Pike. Stakeholders expressed strong support for any actions that would restore and maintain a

Muskellunge-dominated fishery. Catch-and-release for Muskellunge was favored by 92% of Spider Chain anglers, with the remaining responses indicating support for some degree of harvest. The Muskellunge population in the Spider Chain has historically supported an "action" fishery with high abundance and below-average size. Our survey offered some evidence that anglers may prefer a somewhat different Muskellunge population. Trophy size was the preferred management strategy for 48% of those responding, with just 15% expressing an interest in true "action" fishery management. The remaining responses preferred a balance between size and numbers, which is perhaps the best description of where the fishery is today.

Walleye were the second highest ranked species for Spider Chain anglers. This prestigious species has ranked highly in all other fisheries management plans for Sawyer County. Anglers preferred a balance between harvest and catch and release for Walleye (62% of responses) and a balance between size and numbers (69%). These data indicate that anglers may be willing to release some Walleye if it would lead to better Walleye abundance and size structure.

Smallmouth Bass and Largemouth Bass were ranked third and fourth for angling interest, respectively. Responses were nearly identical between species when anglers were asked about whether bass should be managed for abundance (13% preferred this option for both species) or size (30% for Smallmouth Bass, 25% for Largemouth Bass). Most anglers preferred a balanced approach. Differences were more evident when it came to preferences for harvest vs. catch and release. Anglers were more supportive of catch-and-release for Smallmouth Bass (74%) than for Largemouth Bass (57%) and more interested in the harvest of Largemouth Bass overall (though still a minority).

Panfish ranked relatively low, which was true in past snapshots of angler interests from creel surveys of the Spider Chain. Black Crappie ranked highest, followed by Bluegill and then Yellow Perch, though all species received less than 30% "high interest" responses. As such, management of panfish will continue to be a minor emphasis on the Spider Chain and within this plan. Anglers expressed an interest in a balance between size and numbers and between harvest and catch-and-release for all panfish species.

Northern Pike, the newest addition to the Spider Chain fishery, received the lowest angling interest in our survey, with 51% of those responding indicating they had no interest in pike whatsoever and only 6% expressing high interest. Harvest of Northern Pike was the preferred management mode for 75% of those responding, which matches their status as an "introduced" and largely unwanted species. Many stakeholders expressed an interest in eradicating Northern Pike, but as we discuss in more detail on page 31, this is not a realistic management outcome. When asked to choose between managing for abundance or size, 69% of anglers chose size. This combination of results clearly outlines a desire for a Northern Pike population that has limited abundance but individuals with good size.

We asked stakeholders to identify any other species that they had an interest in fishing for in the Spider Chain. A few mentioned Pumpkinseed and Rock Bass, indicating they get the

same enjoyment from those species as with other panfish. Our management strategies for those species will largely mirror what is outlined for panfish. As such, they will not be discussed in detail in this plan and will not receive their own specific goals and objectives.

Habitat became a major theme of the Zoom meeting and was the topic of several comments from our online input form. Several stakeholders expressed a strong interest in promoting habitat projects, even over other popular fisheries management actions (such as stocking). We find that attitude to be commendable, yet the challenges will be identifying impactful projects, gaining private landowner support and obtaining funding. Several worthwhile habitat initiatives are highlighted in later portions of this plan, but clearing the aforementioned hurdles to complete these projects will not be simple.

Additional concerns were expressed about the enforcement of fishing and boating regulations, dam management and climate change. These topics are all highly relevant to fish management and are discussed throughout the plan where applicable and will be given consideration in any future management initiatives.

MANAGEMENT GOALS AND OBJECTIVES

GOAL 1: A moderate-high abundance Muskellunge population with occasional production of trophy fish.

Objective 1.1: 0.6-0.8 adult Muskellunge per acre

Objective 1.2: 5-10% of all adult Muskellunge in spring netting surveys being greater than 42 inches in length

Objective 1.3: Average greater than 0.5 natural born juvenile Muskellunge (<20 inches in length) per mile in fall electrofishing surveys

STATUS AND MANAGEMENT STRATEGIES:
Muskellunge are the focal species of the Spider Chain fishery, and concerns about the future of the fishery were front and center in all public input we received. Anglers report fewer Muskellunge encounters and lower catch rates than in the past. This is generally in line with data from available DNR surveys which are seeing somewhat lower catch rates of Muskellunge (Figure 3) and shifts toward higher size structure (Figure 4), both of which may indicate declining population abundance (though official abundance estimates have not been conducted recently).

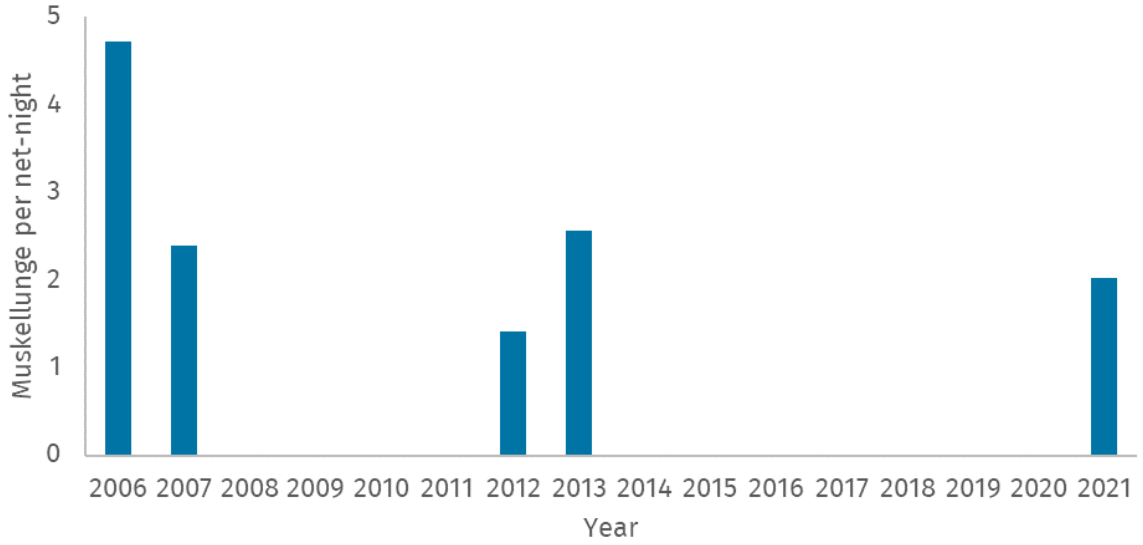


Figure 3. *Catch per effort for Muskellunge in surveys of the Spider Chain since Northern Pike were first documented in the system (2002). All data are from appropriately timed spring netting surveys. No surveys were conducted in years where a bar does not appear.*

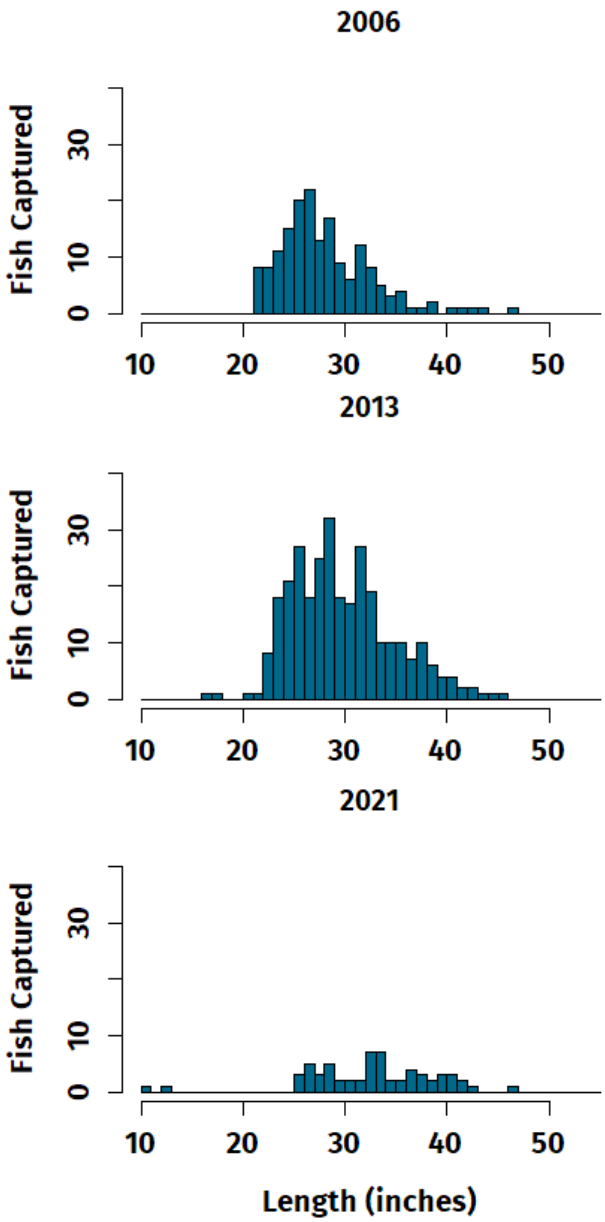


Figure 4. *Size histograms of Muskellunge in the Spider Chain at three points in time. Data are from appropriately timed spring netting surveys. Modal size shifted from 26 inches in 2006, to 28 inches in 2013, to 33 inches in 2021. The difference in the number of fish (height of bars) shown in each panel are not necessarily reflective of changes in abundance, since different amounts of netting effort occurred in each year. See Figure 3 for more direct comparison of abundance.*

The Spider Chain has historically supported strong natural reproduction of Muskellunge, but fall electrofishing surveys now show fewer juvenile Muskellunge than in the past, particularly in certain parts of the chain. The introduction and expansion of Northern Pike throughout the chain is a likely factor driving these changes. The catch rate in DNR fall electrofishing surveys before Northern Pike establishment averaged 1.50 juvenile Muskellunge (<20 inches) per mile surveyed (three total surveys). Since Northern Pike have

become established, the same juvenile Muskellunge catch rate has averaged just 0.27 per mile, with several years where zero juvenile Muskellunge were captured (12 total surveys).

Even in the face of the concerning trends outlined above, there are several reasons to remain optimistic about the future of this Muskellunge fishery and our ability to meet the objectives outlined within this plan.

First, while it may be decreased compared to historical levels, Muskellunge natural reproduction continues to occur in the Spider Chain. Reproduction appears to be happening relatively consistently in Big Spider Lake, but young-of-year fingerlings have also been observed in Little Spider Lake in recent years. The inherent "character" of lakes within the chain make some more suitable for Muskellunge than for Northern Pike. The darker water found in Big, Fawn and North lakes may help buffer potential negative interactions between the two species. This has been observed in other dark-water lakes in the Hayward area, such as Moose and Teal lakes, where Northern Pike are present, but Muskellunge populations remain abundant.

Second, Muskellunge spawning and nursery habitat are in excellent shape throughout the chain, setting the stage for successful reproduction if other conditions are favorable. Still, there may be targeted opportunities for habitat improvement, and any broader strategy to protect shoreline and watershed health will be crucial. Degradation of existing habitat would be an additional hurdle that the Muskellunge population may not be able to overcome.

Realistically, maintaining the desired Muskellunge abundance outlined in Objective 1.1 will require strong natural reproduction. Stocking Muskellunge should be reserved as a last resort to maintain Muskellunge abundance. Undoubtedly, stocking presents itself as a popular action among stakeholders to address any abundance issues. However, anglers often overestimate the positive effects of stocking. Most other stocked populations in Sawyer County support Muskellunge populations with much lower density than what Spider has historically produced (Table 3).

Table 3. *Most recent abundance estimates for notable Sawyer County Muskellunge lakes with different types of recruitment.*

LAKE (YEAR)	ADULT MUSKELLUNGE PER ACRE	RECRUITMENT TYPE
Grindstone (2018)	0.03	Mostly stocked
Sand (2019)	0.08	Mostly stocked
Lost Land (2018)	0.40	Mix, some stocking some natural recruitment
Spider Chain (2013)	0.73	Natural recruitment, no stocking

Additionally, stocking decisions need to be very carefully considered, particularly in a case as unique as the Spider Chain. Managing for genetic differences among populations has become an important component of Muskellunge management (Jennings et al. 2010). The Muskellunge population within the Spider Chain should be assumed to have a unique genome that dictates aspects of Muskellunge behavior, growth and survival. Introducing Muskellunge with a considerably different genetic composition could lead to decreases in population fitness, including reduced potential for future natural reproduction.

Currently, there are no hatcheries, state or private, that rear Spider Chain Muskellunge. DNR hatcheries rear Muskellunge using eggs collected from wild fish in several other lakes within the Upper Chippewa drainage: the Chippewa Flowage, Lac Courte Oreilles and Teal/Lost Land. Additional genetic testing would need to occur to determine if any of these source populations are suitable for stocking into the Spider Chain. It is unlikely that eggs from the Spider Chain would ever be used for rearing fish from DNR facilities, and getting eggs from Spider Chain to private growers would also be challenging.

We propose the following approach to managing Muskellunge abundance and making decisions about future stockings.

1. Continue annual fall electrofishing surveys to document Muskellunge reproduction (Objective 1.3). These surveys will allow for detection of any significant changes in reproductive success that might be tied to management actions and could forecast increases or decreases in adult population size.
2. Collect updated genetic samples from Muskellunge in the Spider Chain to be analyzed by the Cooperative Fisheries Research Unit in Stevens Point (PARTNER OPPORTUNITY). This analysis will help us determine if a suitable brood source exists for future stocking needs.
3. Conduct a population estimate for adult Muskellunge in the Spider Chain between (2023 and 2026). This estimate will allow us to determine if the population is meeting the target of Objective 1.1.
4. Any potential future stocking should include a means to track stocking success. This may be accomplished through tagging or marking stocked fish with fin clips (PARTNER OPPORTUNITY). There may also be genetic tools available to help determine stocking contributions.
5. Conduct another population estimate around 2032 (10 years after plan implementation) to determine if the combined actions have led to the desired population abundance (Objective 1.1). If not, adjust management strategies based on new information obtained since the creation of this plan.

We expect that Muskellunge size structure will largely be a function of population density, particularly considering that the harvest of legal-sized Muskellunge is extremely uncommon (Table 2). When abundance has been high in Spider Chain, size has been lower. As abundance has declined, we have observed corresponding increases in size (Figure 4, 5 and 6). Objective 1.2 outlines a population with the type of size structure we would expect under the target abundance from Objective 1.1. The current size structure is 3% over 42 inches (see Figure 5).

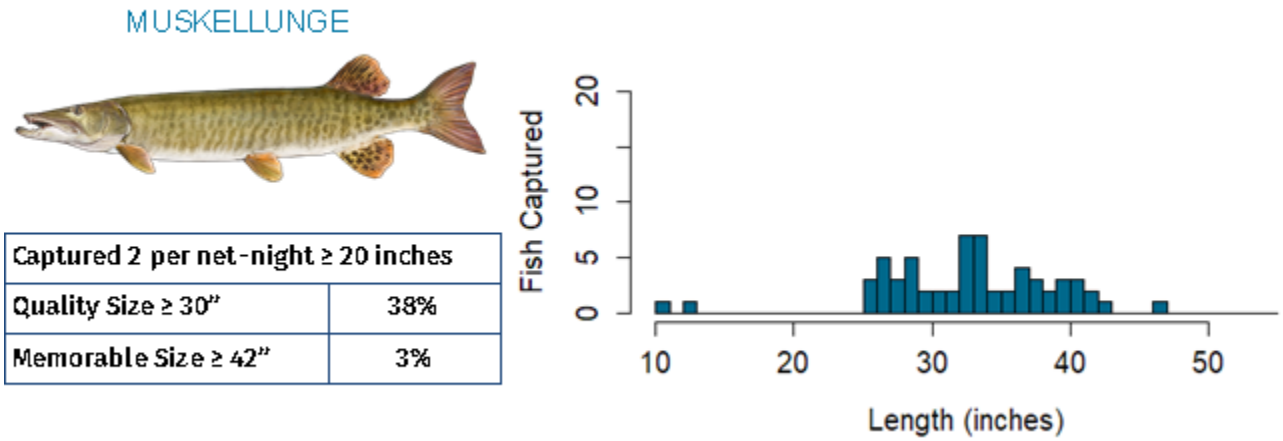


Figure 5. *Measures of relative abundance, size structure and size histogram for Muskellunge in the Spider Chain based on 2021 survey efforts.*

Figure 6. *Large Muskellunge, like this one captured in a 2021 DNR survey, were historically rare in the Spider Chain but have become more common. Catch and release and possible declines in abundance are likely contributing factors to the increased prevalence of large muskies. Photo by Kallie Thompson*

Maintaining successful Muskellunge reproduction (Objective 1.3) will require effective holistic management of the fish community and habitat in the Spider Chain. Northern Pike have the potential to limit Muskellunge reproductive success, as has been documented in several other lakes in the area (Lac Courte Oreilles Fishery Management Plan, Inskip 1986). Maintaining Northern Pike at a low enough abundance to allow significant Muskellunge reproduction will be a difficult and continual challenge. Strategies specific for managing

Northern Pike abundance are found later in this plan. We should be aware that even under the best-case scenario, Muskellunge reproduction may never return to the historic levels that supported the high population abundance the Spider Chain was known for.

Additionally, all other factors that influence spawning success, such as minimizing impacts of shoreline development, maintaining a healthy aquatic plant community, and minimizing nutrient inputs, need to be effectively managed by shoreline property owners and resource professionals at the state and county level. Studies of Muskellunge in the Spider Chain have shown that they repeatedly use the same areas to spawn (Jennings et al. 2011). This suggests that degradation of any individual spawning area could have population-level impacts since Muskellunge may be unlikely to just "go spawn somewhere else."

GOAL 2: A successful and efficient stocked Walleye population that creates a bonus gamefish fishery and an occasional harvest opportunity

Objective 2.1: Adult Walleye abundance of 1-2 per acre in spring population estimates, or a catch rate of 5-10 per net night in years when a population estimate is not conducted.

Objective 2.2: 40-60% of adult Walleye over 15 inches, with an additional 20-30% over 20 inches.

STATUS AND MANAGEMENT STRATEGIES:
The Spider Chain has supported a Walleye population that is modestly successful biologically (Figure 7 for current population statistics) and very popular socially. Those combined statuses are encapsulated by the high-rank Spider Chain anglers gave Walleye (#2 species overall, Appendix B) despite the population being perpetually at low abundance relative to other gamefish.

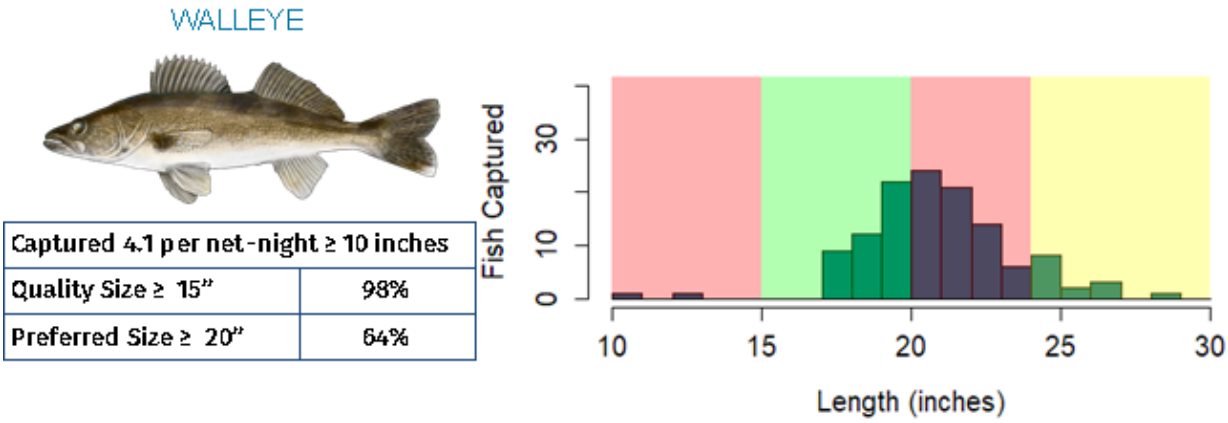


Figure 7. *Measures of relative abundance, size structure and size histogram for Walleye in the Spider Chain based on 2021 survey efforts.*

The Spider Chain has been reliant on stocking to maintain a Walleye population. There is no evidence of sustained or biologically significant natural reproduction of Walleye, though a very small amount may occur. The specific reasons for the lack of natural reproduction are not known. Spawning substrates in many parts of the Chain seem suitable, so there is no reason to believe that structural habitat additions would change Walleye reproduction success. We should not expect the natural reproduction of Walleye in the Spider Chain in the future, given that natural reproduction is becoming less common even in lakes where it has historically existed as a result of climate change (Hansen et al. 2017). Objective 2.1 is crafted to reflect the expectation that the Spider Chain will remain a lower-density stocked fishery (population statistics in Figure 7) that can produce fish that anglers are very happy with (Figure 8), with some potential opportunities for improvement in stocking success outlined below. The population has previously achieved the target from Objective 2.1 solely through stocking (Appendix A).

Figure 8. *Walleye in Spider Chain achieve good size, likely due to their low abundance. This fish is from a 2021 netting survey. Photo by Kallie Thompson*

Stocking practices have varied widely over the years and have included several sizes of fingerlings and state, tribal and private-led stocking efforts (Appendix C). Stocking success has been limited, especially compared to other Sawyer County lakes receiving similar-sized fingerlings (Figure 9). This plan will seek to develop a more focused and effective stocking strategy for the Spider Chain that will deliver the best possible Walleye fishery under the efficient use of public and private resources.

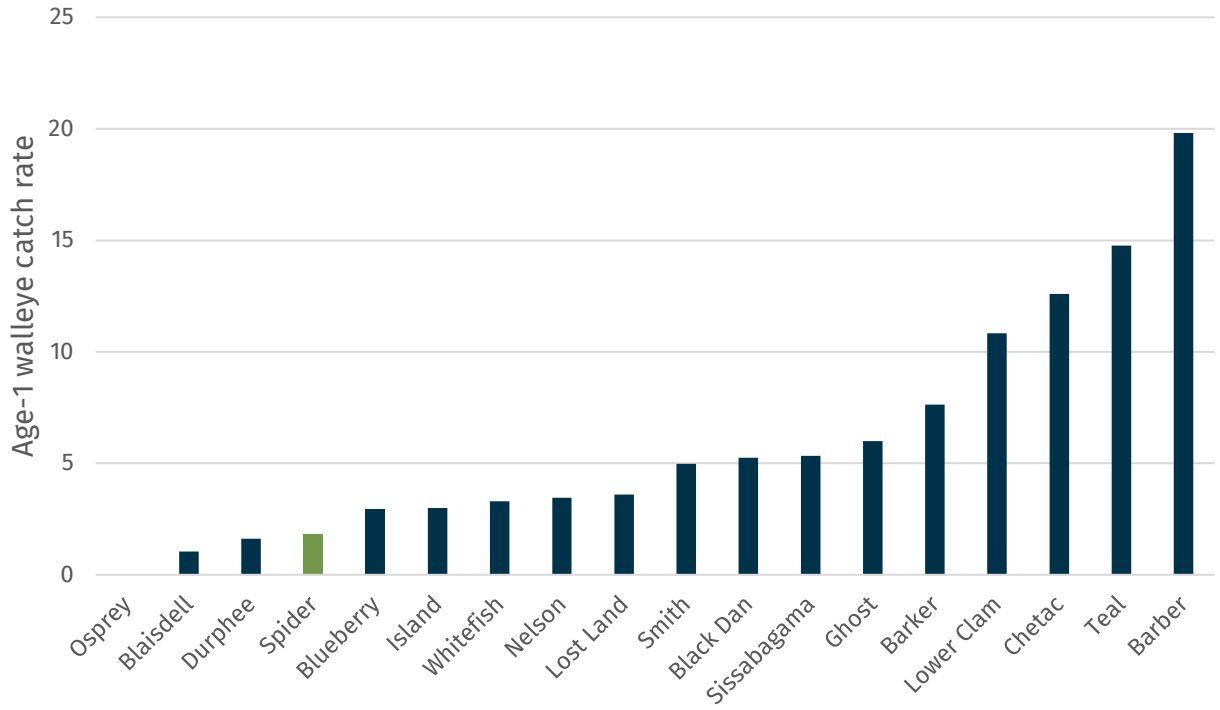


Figure 9. *Comparison of age-1 Walleye catch rates in stocked waters of Sawyer County. Surveys are conducted one year after Walleye stocking and includes only years where no significant natural reproduction occurred. Data points for most individual lakes are an average of surveys of 2-4 stocked year classes. Stocking rates vary among lakes.*

The following process should be used to develop a regular stocking plan for the Spider Chain that can be agreed upon by the local DNR biologist, lake association and other private individuals interested in stocking:

1. **Determine stocking rate:** Large fingerling Walleye (6-8 inches in length, stocked in early fall) are going to be the most available and logical size for stocking into the Spider Chain. However, stocking fingerlings of that size is a relatively new practice, and ideal stocking rates are not known. The DNR is currently conducting a statewide evaluation of large fingerling Walleye stocking rates (varying from 5-20 per acre), and the results of that study could help inform decisions for the Spider Chain. However, we also have the ability to vary rates across different stocking events within the Spider Chain and learn from past stockings of different rates. A stocking rate of five large fingerlings/acre was used in 2015 and 2019. In 2021, a stocking rate of 15/acre was used. Age-1 catch rates in the years following stocking will be our most available metric to determine stocking success under different stocking rates. If lower stocking rates (5/acre) are found to generate similar age-1 catch to higher rates (15/acre), the lower stocking rate should be used to minimize expenses. A combination of state and private stocking may be used to generate different stocking rates over the next five years to determine what rate might be most efficient.

2. **Determine stocking frequency:** The DNR has been stocking large fingerling Walleye into individual waters on an every-other-year basis, based on logistics and some biological evidence (Li et al. 1996). The availability of private stocking for Spider Chain means that stocking could be done annually. However, it may not be efficient. Stocking frequency can also be varied to determine if noticeable changes are observed in the age-1 catch rate.
3. **Stocking contributors:** The DNR is currently stocking large fingerling Walleye at a rate of 5 fish/acre into the Spider Chain in odd-numbered years. If 5 fish/acre on an every-other-year basis is determined to be an efficient rate and frequency, stocking needs may be met by the DNR, and private contributions may not be necessary. However, if a higher stocking rate or frequency is shown to be beneficial, or if fish are not available through the DNR, private stocking can be permitted. Private stocking may be used during a period of experimentation with different rates and frequencies over the next five years. Private stocking can also provide Walleye to North Lake, which is typically not included in acreage calculations or stocking distribution plans by the DNR. Private stockings should be organized through a designee of the Spider Lake Association rather than individuals so that stakeholders can be aware of private stocking plans. Permits are needed for any private stocking.

Angling regulations for Walleye should allow the harvest of adults with no special restrictions, based on the population's status as a stocked fishery and angler preferences (Appendix B). The regional or statewide regulation is appropriate at this time, and we do not anticipate a future need for special regulations to deliver the objectives in this plan.

GOAL 3: A bass fishery that offers moderate size structure for both species, and harvest opportunities for smaller Largemouth Bass.

Objective 3.1: 10-15 Largemouth Bass per mile in spring electrofishing surveys

Objective 3.2: 5-10 Smallmouth Bass per mile in spring electrofishing surveys

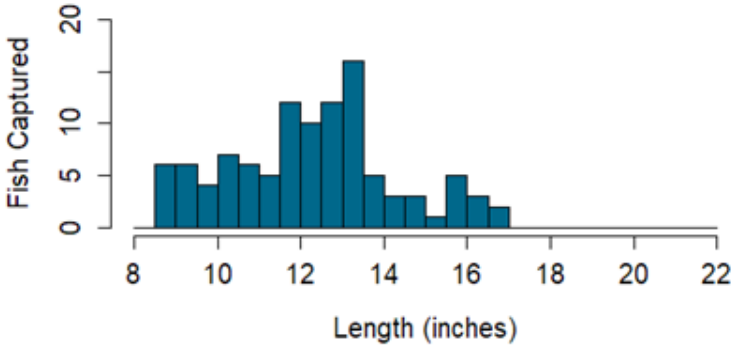
Objective 3.3: 20-40 percent of all Largemouth Bass over 14 inches in spring electrofishing surveys

Objective 3.4: 30-50 percent of all Smallmouth Bass over 14 inches in spring electrofishing surveys

STATUS AND MANAGEMENT STRATEGIES:
Both bass species are lumped together within this goal based on general similarities in how Spider Chain anglers view them (some differences acknowledged below). There are currently some differences in relative abundance and size structure between the two species (Figure 10.) Habitat diversity of the Spider Chain should allow both bass species to be successful, and only slightly different management approaches are needed to achieve objectives 3.1-3.4.

LARGEMOUTH BASS

Captured 18 per mile ≥ 8 inches	
Quality Size ≥ 12"	56%
Preferred Size ≥ 15"	10%



SMALLMOUTH BASS

Captured 4.1 per net mile ≥ 7 inches	
Quality Size ≥ 11"	60%
Preferred Size ≥ 14"	32%
Memorable Size ≥ 17"	8%

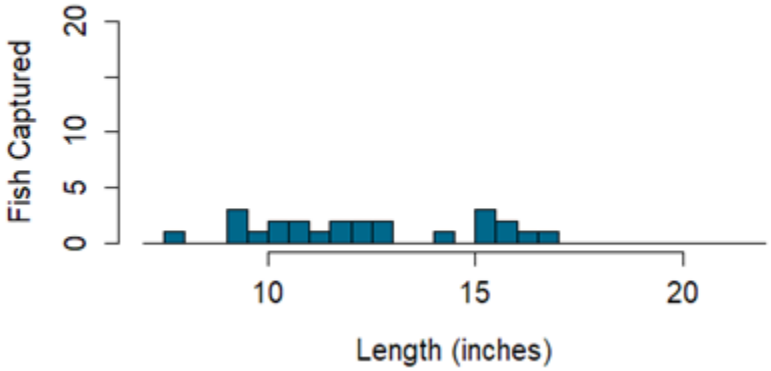


Figure 10. *Measures of relative abundance, size structure and size histogram for Largemouth Bass (top) and Smallmouth Bass (bottom) in the Spider Chain based on 2021 survey efforts.*

There is evidence that Largemouth Bass may currently be too abundant in the Spider Chain. Previous analyses have found the growth rates of Largemouth Bass in the Spider Chain to be slow (Figure 11). Intra-species competition may be one explanation for slower growth. Slight reductions in Largemouth Bass abundance to levels described by Objective 3.1, may increase the Largemouth Bass growth rate and lead to increases in size structure (Objective 3.3).

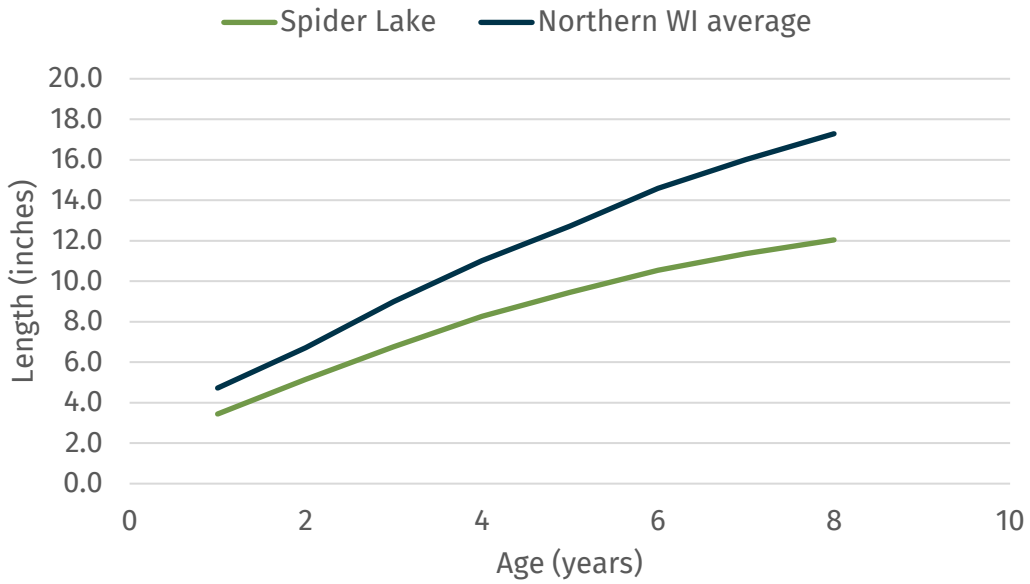


Figure 11. *Mean length at age of Largemouth Bass in Spider Chain based on otoliths collected in 2013. An average growth rate for northern Wisconsin is shown for comparison.*

Liberalized regulations for bass were applied in 2016 (no minimum length limit, 5-daily bag limit for both species combined), with the intention of providing more harvest opportunities for Largemouth Bass less than 14 inches in length. It may take a combination of time and increased angler interest in harvesting small Largemouth Bass for improvements in size structure to be observed. That regulation should be evaluated as a part of future surveys and should include an updated growth rate analysis.

Smallmouth Bass occur at a lower density, occupy different habitats and are believed to have a different diet (less fish, more crayfish) than Largemouth Bass in the Spider Chain. As such, we do not believe Smallmouth Bass are constrained by the same intra-specific competition. Smallmouth Bass abundance is likely limited more by the availability of preferred habitat, which is reflected in the targets set for Objectives 3.1 and 3.2. Abundance objectives for Smallmouth Bass can likely be achieved passively, though habitat additions such as tree drops and half-log spawning structures may also be beneficial (PARTNER OPPORTUNITY).

The current bass regulations on the Spider Chain are not ideal for Smallmouth Bass. More protective regulations may allow for better Smallmouth Bass size structure (Objective 3.4) and align with angler preferences as expressed during the zoom session and online feedback form. Optimal bass regulations may require split regulations for each species, as has been done on a handful of other area lakes (Round, Grindstone, Lac Courte Oreilles, Chippewa Flowage). A regulation proposal to provide additional protection for Smallmouth Bass while continuing to allow liberal harvest of smaller Largemouth Bass would need to be

approved by both the DNR Fisheries Management program and the Wisconsin Conservation Congress.

GOAL 4: A Black Crappie fishery that offers moderate abundance and catch rates.

Objective 4.1: 5-15 Black Crappies per net-night in spring netting surveys

Objective 4.2: Of all Black Crappies appearing in spring netting surveys, 15-40% should be over 10 inches.

STATUS AND MANAGEMENT STRATEGIES:
Black Crappies received the most angler interest among panfish species and were by far the most harvested panfish in the last creel survey (91% of estimated panfish harvest was Black Crappies). Black Crappies have been the only panfish species to consistently reach sizes that anglers find acceptable for harvest.

Very little active management to promote Black Crappie has happened on the Spider Chain, as the management emphasis and attention have typically been on gamefish species. Given the relatively low ranking from Spider Chain anglers for Black Crappies, and panfish overall, we are not proposing any major shifts to the gamefish-oriented management strategy. Still, there may be small actions that can improve the Black Crappie population that align with strategies for other species.

One action will be simply to increase our understanding of Spider Chain Black Crappies. Most past surveys of the Spider Chain did not target Black Crappies or collect data that could be used for management decisions. Future surveys should include Black Crappies as a target species whenever possible.

Our most recent survey documented the current status of the Black Crappie population, finding them to be relatively abundant but with few large individuals (Figure 12). We also conducted a growth rate analysis that found very average growth for Spider Chain Black Crappies relative to other lakes in the area with available data (Figure 13).

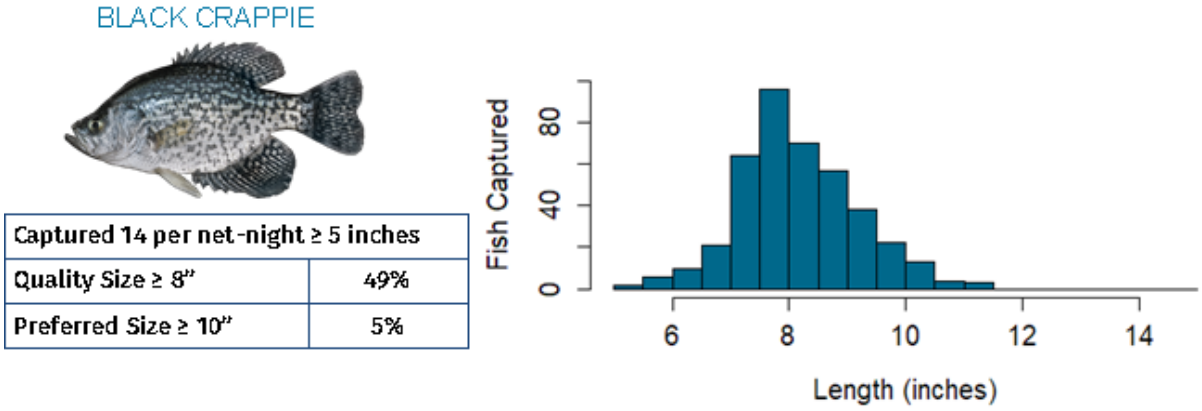


Figure 12. *Measures of relative abundance, size structure and size histogram for Black Crappies in the Spider Chain based on 2021 survey efforts.*

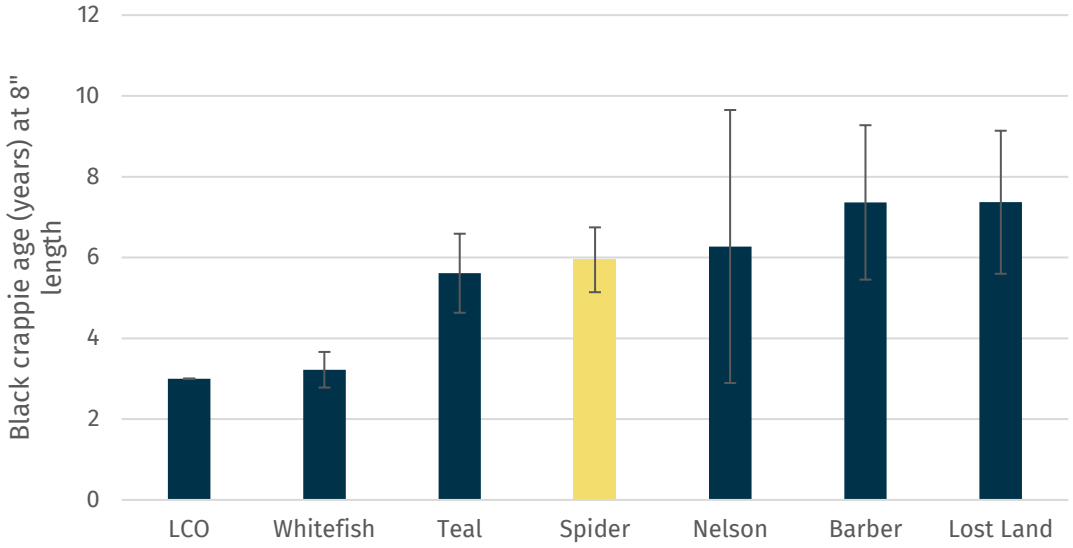


Figure 13. *Average amount of time (years) it takes Black Crappie to reach 8 inches in the Spider Chain relative to other lakes in Sawyer County where similar data were available. Age and growth were determined based on otoliths collected in 2021. Note: higher bars indicate slower growth based on a longer amount of time needed to reach 8 inches of length.*

Shoreline wood may offer some benefits to Black Crappie and should be preserved and even supplemented by private landowners where possible. Wood additions have already been made on suitable state-owned shorelines. Future wood addition projects on privately-owned shorelines should be explored (PARTNER OPPORTUNITY).

We are not proposing any changes to panfish regulations at this time, but new information could lead to a regulation change proposal in the future. The DNR is currently evaluating the effectiveness of a suite of experimental regulations to improve panfish populations. If one of these regulations was determined to be effective and was considered for broader

application, Spider Lake may be a suitable candidate in the future, particularly if Objective 4.2 is not being met consistently and future creel data indicate harvest is limiting our ability to meet Objectives 4.1 or 4.2.

GOAL 5: A Bluegill fishery that offers high catch rates, recreational opportunities for less experienced anglers, and a small amount of harvest.

Objective 5.1: 100-200 Bluegill per mile in spring electrofishing surveys

Objective 5.2: Of all Bluegill captured in spring electrofishing surveys, 5-15% should be over 7 inches in length

STATUS AND MANAGEMENT STRATEGIES:
Past and recent survey data consistently show that the Bluegill population in the Spider Chain has never achieved high-size structure (Figure 14). The same is true for the other lakes in the North Fork of the Chief River drainage, Tiger Cat Chain, Clear Lake and Mud/Callahan Lake. The abundant, small-bodied Bluegill in these lakes appears to be a relatively hard-wired characteristic of the fisheries. The growth of Spider Chain Bluegills is slow relative to other lakes in the area (Figure 15). Past attempts to improve Bluegill growth and size structure through predator manipulations, removals and prey supplementation have all been unsuccessful, especially in producing any long-term changes.

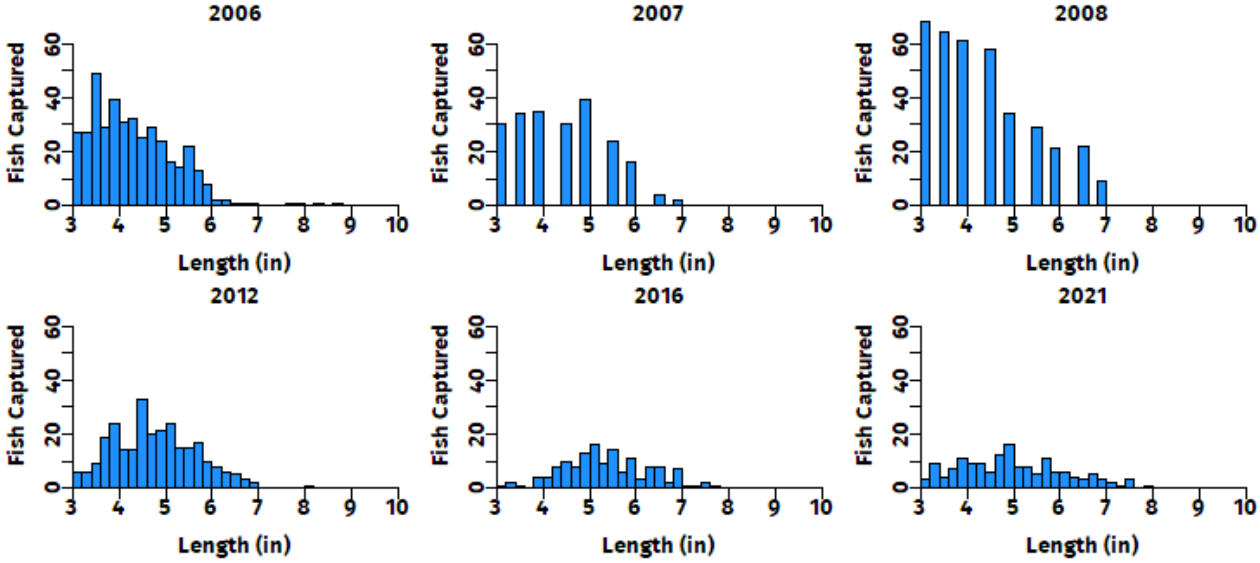


Figure 14. *Size histograms of Bluegill captured in DNR spring electrofishing surveys of the Spider Chain by year.*

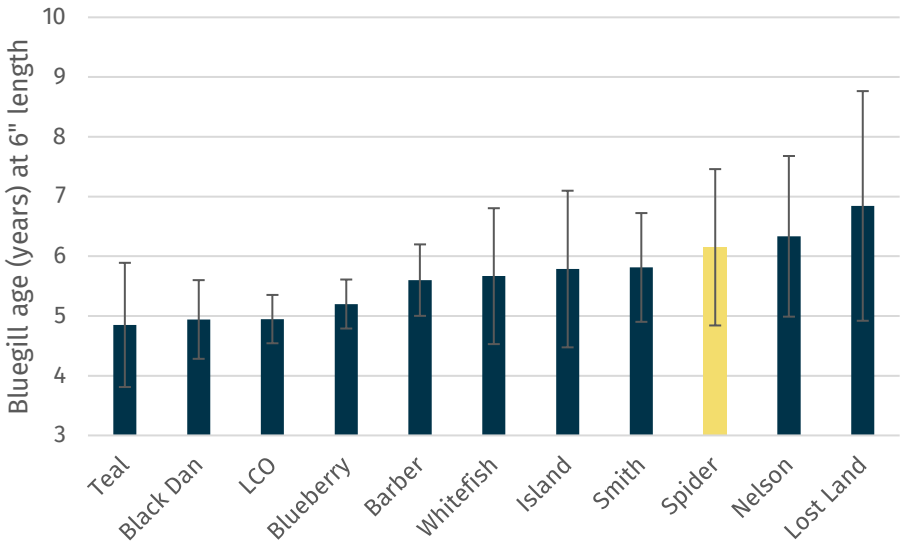


Figure 15. *Average amount of time (years) it takes Bluegill to reach 6 inches in the Spider Chain relative to other lakes in Sawyer County where similar data were available. Age and growth were determined based on otoliths collected in 2021. Note: higher bars indicate slower growth based on a longer amount of time needed to reach 6 inches of length.*

Most anglers we interacted with appear to be resigned to the fact that large Bluegills are unlikely to occur in the Spider Chain, as evidenced by the low rating for the species. Still, some anglers expressed their desire to see Bluegill and other panfish size improved. We want to temper expectations for any significant changes in Bluegill size, given the long-standing and consistent poor size of the population (Figure 14) and lack of clear mechanisms to change it. Instead, this plan asks anglers to accept the Bluegill population for what it is: an abundant species that brings satisfaction to younger anglers but will only rarely result in a fish fry (Figure 16 shows current population statistics). Objectives 5.1 and 5.2 are crafted with that vision for the fishery. Those objectives can be revisited if conditions change in the future or viable tools to manipulate the bluegill population become available.

BLUEGILL

Captured 103 per mile ≥ 3 inches	
Quality Size ≥ 6"	21%
Preferred Size ≥ 8"	1%

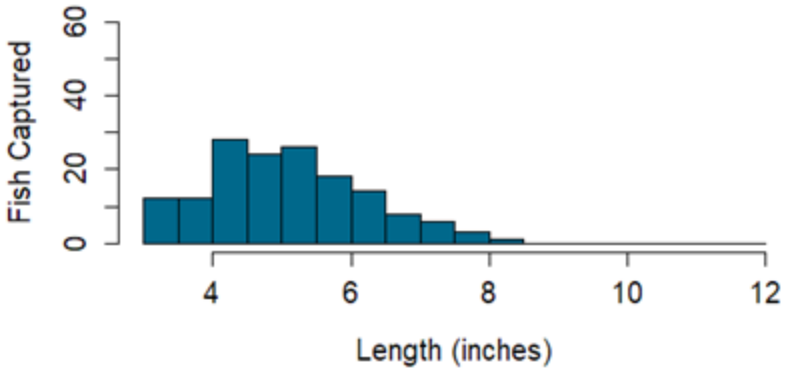


Figure 16. *Measures of relative abundance, size structure and size histogram for Bluegill in the Spider Chain based on 2021 survey efforts.*

GOAL 6: A Yellow Perch population that offers high catch rates, recreational opportunities for less experienced anglers and a small amount of harvest.

Objective 6.1: 5-10 Yellow Perch per net night in spring netting surveys

STATUS AND MANAGEMENT STRATEGIES:
Yellow Perch are common throughout the Spider Chain but were a low-ranking species for anglers. Yellow Perch's lack of popularity likely reflects their generally small size (Figure 17) and the limited angling opportunities they provide.

YELLOW PERCH

Captured 2.3 per net-night ≥ 5 inches	
Quality Size ≥ 8"	0%
Preferred Size ≥ 10"	0%

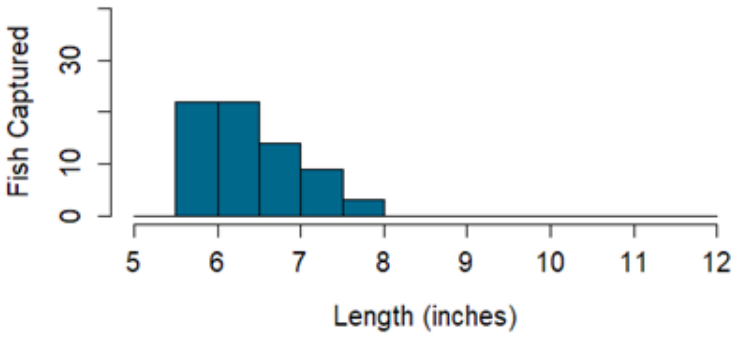


Figure 17. *Measures of relative abundance, size structure and size histogram for Yellow Perch in the Spider Chain based on 2021 survey efforts.*

However, even if Spider Lake Yellow Perch are not going home in livewells, they still have importance to the fishery. Yellow Perch are a consistent diet item in studies of Muskellunge, Northern Pike, bass and Walleye (Bozek et al. 1999, Margenau et al. 1998, Kelling et al. 2016).

A healthy Yellow Perch population can be expected to support the gamefish species that are prioritized in this plan.

Yellow Perch harvest in the Spider Chain is rare, so changes to angling regulations are unlikely to be impactful. Stocking Yellow Perch to increase abundance and provide prey for gamefish is prohibitively costly and logistically impossible. That leaves habitat protection/improvement as the most impactful action to meet Objective 6.1.

Yellow Perch benefit from the availability of diverse habitats that include aquatic vegetation and submerged wood, both of which are used for spawning and feeding habitat. Efforts should be made to maintain and enhance the native plant community (which will benefit virtually all species). Yellow Perch have been shown to be sensitive to losses of near-shore woody habitat (Sass et al. 2006). Restoring woody habitat, through additions along private shorelines, has the potential to increase Yellow Perch production, along with other fisheries benefits (PARTNER OPPORTUNITY).

GOAL 7: Maintain introduced Northern Pike at a low abundance, minimizing negative interactions with native species and allowing better size structure.

> **Objective 7.1:** Less than one adult Northern Pike per acre in population estimates or less than three per net night in spring netting surveys in years when a population estimate is not available.
>
> **Objective 7.2:** 10-20% of adult Northern Pike being 28 inches in length or longer

STATUS AND MANAGEMENT STRATEGIES:
While they are listed last in this plan based on angling interest (very low), Northern Pike were one of the species that drew the most conversation among stakeholders during our feedback opportunities. The specific origin of Northern Pike in the Spider Chain is unknown, but at this point, that information is largely irrelevant to our management. Northern Pike first appeared in a DNR survey in 2002. Northern Pike are now firmly established and reproducing successfully throughout the Spider Chain, with evidence that their abundance has been increasing. Eradication of Northern Pike in this large, complex system is not a realistic goal. Therefore, we establish Goal 7 and related Objectives 7.1 and 7.2 as a means to manage the best possible outcome for a fishery that will now and forever include Northern Pike.

Negative interactions between Northern Pike and other fish species are well-documented (Dunker et al. 2018) and may be particularly acute when Northern Pike are not native to a waterbody (Inskip 1986). Negative competitive interactions between Northern Pike and Muskellunge are of particular interest in the Spider Chain, given the overlap in life history and habitat requirements between the two species and the popularity of the Muskellunge fishery. Part of the impetus of this plan was to develop a strategy for managing this interaction in the Spider Chain.

Northern Pike are adaptive and resilient, and we should expect that successful Northern Pike reproduction and recruitment will continue in the Spider Chain. With a continual influx of new Northern Pike, the critical questions become:

1. What needs to be done to limit the abundance of adult Northern Pike?
2. What can we do to promote Muskellunge recruitment into the fishery in the presence of competing juvenile Northern Pike?

Both of these questions are challenging and will require monitoring, plus trial and error management strategies by the DNR and partners to develop answers. Question 2 (Muskellunge recruitment) is more directly addressed in the section for that species. Here we will focus on managing the abundance of adult Northern Pike.

Mechanical removals of Northern Pike via netting or electrofishing are a theoretical option but have very limited application to the Spider Chain at this time. A 2021 effort that included 30 net-nights of fyke netting and 6 miles of electrofishing only captured 52 Northern Pike (1.3 per net-night, Figure 18). Capture rates for Northern Pike in DNR surveys are likely to remain low if the actual population density is close to the target established in Objective 7.1. In other words, by the time a lot of Northern Pike are being caught in DNR surveys, their abundance may already be much higher than desired.

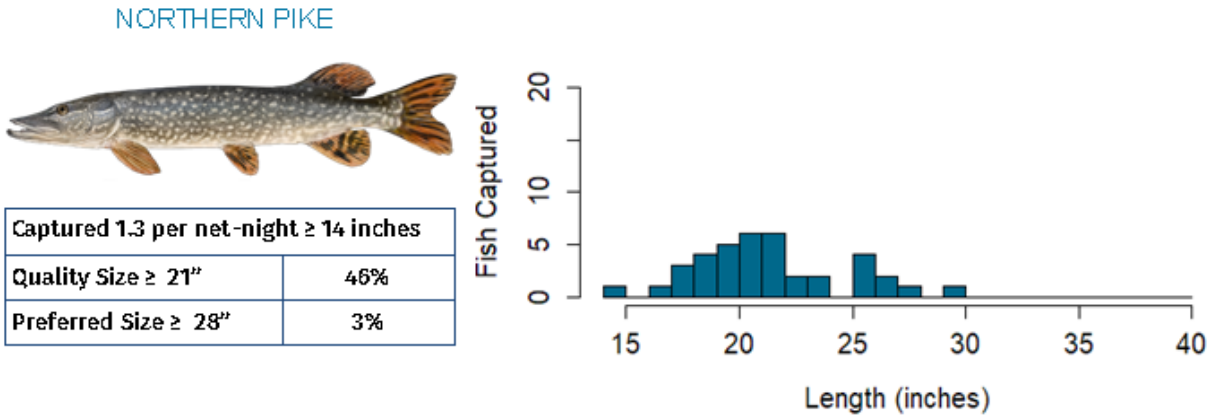


Figure 18. *Measures of relative abundance, size structure and size histogram for Northern Pike in the Spider Chain based on 2021 survey efforts.*

To effectively remove Northern Pike from a population that is already low-density, we must rely on other means of capture. Angling is likely the most feasible option for the Spider Chain and offers several benefits. Angling occurs throughout the Spider Chain, accounts for a significant amount of total effort, and spans the open water season (unclear how much Northern Pike are targeted via ice fishing in the Spider Chain at this point). Additionally, Northern Pike control through angling is effectively free, taking advantage of an army of anglers that already plan to be out on the water. The challenge with using angling as a control method will be convincing anglers to choose to harvest Northern Pike they catch, especially very small ones.

Fortunately, the message of harvesting Northern Pike already seems to be resonating with engaged stakeholders in the Spider Chain. As a part of our online input to this planning process, we asked several questions about people's experiences with Northern Pike and harvest. A majority of anglers (60%) reported: "frequently catching pike in the Spider Chain (often one or more a day)". Most anglers who responded said they keep a Northern Pike when they catch it (70%). Despite being an introduced species that are recommended for harvest, Northern Pike in the Spider Chain are still regulated by the statewide 5-daily bag limit. Anglers responding to our survey reported that they have been restricted from harvesting more Northern Pike by that limit, with 40% saying they "have caught five or more pike in a single day of fishing" (this author has had the same experience on the Spider Chain).

Programs to educate anglers on the benefits of harvesting Northern Pike and potentially incentivize those that would otherwise be uninterested in harvest could benefit the Spider Chain. In fact, such a program was established by a group of stakeholders in 2021. A website was created that displayed basic information on the importance of harvesting Northern Pike and allowed anglers to track their catch (Figure 19). This approach was coupled with organized angling days, where anglers could donate any Northern Pike that they did not want to personally keep. Continuing and expanding these types of efforts may be key to bringing more anglers on board with Northern Pike harvest.

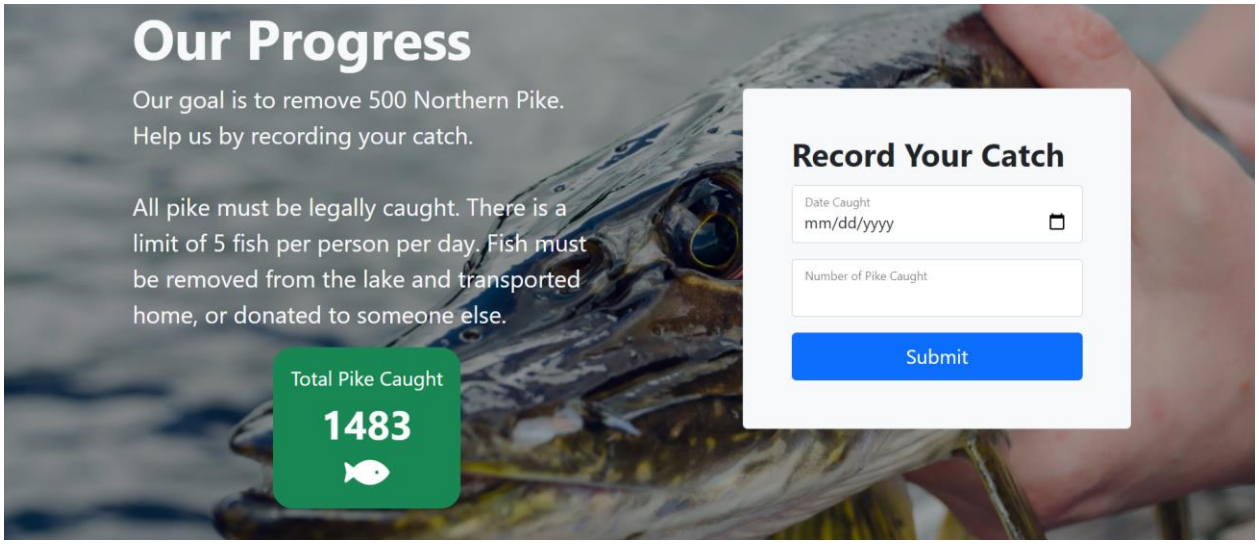


Figure 19. *A screen grab of the website used to track Northern Pike harvest in the Spider Chain in 2021.*

Several important messaging points need to be considered and included in any communications about harvesting Northern Pike. First, Northern Pike (or any species) should never be killed and left in the water or tossed on shore. Such "wanton waste" is illegal under Wisconsin law, and anglers participating in these behaviors may be fined. Northern Pike need to be legally harvested, meaning they must leave the water with the angler. Second, anglers need to be conscious of harvest regulations, which still apply in a case like this. Anglers may harvest up to five Northern Pike per day (no size restrictions) and

cannot have more than 10 in their possession (total in the freezer, livewell, stringer, etc.). Once Northern Pike are eaten or given to another individual, they are no longer a part of someone's possession limit.

New, more liberal harvest regulations for Northern Pike should be explored given that angling is our most realistic means of controlling abundance and anglers are often limited by the current angling regulations. The most direct option would be an increase in the daily bag limit. Another option could include a year-round harvest season. These options will be explored within the DNR Fisheries Management program and any feasible means to liberalize Northern Pike harvest regulation will be pursued by the local biologist. The concept of "mandatory" Northern Pike harvest was suggested by several stakeholders, but such a rule would be nearly impossible to enforce and may be viewed negatively by many anglers.

The situation of introduced Northern Pike in a high-density, naturally reproducing Muskellunge lake is relatively unique. There are few other management examples we can draw from for strategies or ideas about expected outcomes. This will be an area where strong collaboration among partners will be necessary for any chance at maintaining the desired fishery. Even after putting forth the best possible effort, we should be prepared for certain degrees of failure and the need to readjust expectations in the future.

GOAL 8: A diverse native fish community that fluctuates in species abundance but generally experiences no net loss of native fish species and provides adequate forage for sport fish populations.

Objective 8.1: No net loss of native fish or other aquatic species diversity, as documented by periodic baseline monitoring surveys.

Objective 8.2: Adequate forage, as reflected by satisfactory growth rates and condition factors of sport fish populations.

GENERAL ECOSYSTEM STATUS AND MANAGEMENT STRATEGIES:
Adequate year-round water quality is vital to maintain sport fish populations with acceptable growth rates and size structures. Support for good shoreland management along privately-owned shorelines will help to prevent excessive input of nutrients. Maintaining wild shorelines and wide buffer strips between managed lawns and the lake will be helpful in achieving the goals and objectives of this plan. Wild shorelines can exist on well-managed private properties as well as public lands. The addition of woody habitat is also beneficial to support biodiversity and ecosystem health, as highlighted in several areas of this plan.

Active aquatic invasive species prevention programs should continue. There are numerous invasive plant and animal species that could have extremely detrimental effects on the Spider Chain's aquatic ecosystem. Several DNR grants are available to partner groups to aid in invasive species prevention and management.

SUMMARY OF MANAGEMENT RECOMMENDATIONS AND ACTIONS

The following management actions are included in this plan (page references included):

- Conduct shoreline woody habitat survey (p. 6)
- Conduct Muskellunge population estimates and fall recruitment surveys (p. 13)
- Collect and analyze genetic samples from Muskellunge (p. 13)
- Promote natural reproduction of Muskellunge with stocking as a reserve action (p. 13)
- Develop a Walleye stocking plan with partners using evaluations of past and future stocking events (p. 17-18)
- Conduct growth rate analysis for Largemouth Bass (p. 20)
- Explore more restrictive regulations for Smallmouth Bass (p. 20)
- Coordinate efforts to promote angler harvest of Northern Pike and explore more options for more liberalized pike harvest regulations (p. 27-30)
- Support private landowners interested in habitat restoration
- Conduct necessary surveys to measure success at achieving objectives established in this plan

The following partner opportunities are identified in this plan (page references included):

FUNDING

- Muskellunge genetic analyses (p. 13)
- Private Walleye stocking (p. 17-18)
- Costs associated with Northern Pike control efforts (p. 27-30)

VOLUNTEER OPPORTUNITIES

- Fin clipping stocked fish (p. 13, 17-18)
- Assist with shoreline woody habitat survey (p. 6)

HABITAT

- Conduct tree drops or fish sticks on private shorelines (p. 22, 26)
- Pursue other "Healthy Lakes" practices (see link)

APPENDIX A

Appendix A shows a comparison of the management objectives for the Spider Chain to other lakes and past survey data.

Table A1. *Species-specific abundance objectives for the Spider Chain fishery from this plan, with relevant comparisons to other lakes and past survey data. Note: The lake class referenced in this table is "complex-cool-clear."*

ABUNDANCE OBJECTIVES			
Species	**Objective in this plan**	**How it compares to similar lakes**	**What has previously been observed in Spider Chain**
Muskellunge	0.6-0.8 adults/acre	Higher than other Sawyer County Muskellunge waters, which typically range from 0.1-0.4 adults per acre	0.3 - 0.7 per acre in past estimates
Walleye	1-2 adults per acre	Lower than the target for most naturally reproducing populations, but is similar to targets for stocked populations (typically around 1.5/acre)	1.5-2 per acre in past estimates
	5-10 per net-night	Upper end of the objective range is near the 75th percentile for the lake class	4-6 per net-night (2 surveys)
Bass	10-15 largemouth per mile in electrofishing surveys	Upper end of the objective range is near the 75th percentile for the lake class	14-19 per mile (4 surveys)
	5-10 smallmouth per mile in electrofishing surveys	Upper end of the objective range is near the 75th percentile for the lake class	3-4 per mile (4 surveys)
Black Crappie	5-10 per net-night in spring surveys	Objective range is near the 75th percentile for the lake class	14 per net-night (1 survey)
Bluegill	100-200 per mile in electrofishing surveys	Objective range is close to the 50th-75th percentile for the lake class	103-164 (4 surveys)
Yellow Perch	5-10 per net-night in spring surveys	Objective range is around the 50th percentile for the lake class	2 per net-night (1 survey)
Northern Pike	Less than 1 per acre	Very few pike population estimates have been done in this area; this objective calls for lower density than native pike lakes	Not available
	Less than 3 per net-night in spring surveys	Objective would be less than the 75th percentile for the lake class	1.3 per net-night (highest observed in any survey)

Table A2. *Species-specific size objectives for the Spider Chain fishery from this plan, with relevant comparisons to other lakes and past survey data.*

SIZE OBJECTIVES			
Species	**Objective in this plan**	**How it compares to similar lakes**	**What has previously been observed in Spider Chain**
Muskellunge	5-10% over 42 inches	Lower than targets for other lakes, based on higher abundance and slower growth in Spider Chain	0-6% over 42 inches (3 surveys)
Walleye	40-60% over 15 inches	Comparable to targets for other stocked lakes in the Hayward area	73-98% over 15 inches (2 surveys)
	20-30% over 20 inches	Comparable to targets for other stocked lakes in the Hayward area	32-64% over 20 inches 92 surveys)
Bass	20-40% of largemouth over 14 inches	Comparable to targets for other area lakes	11-16% over 14 inches (2 surveys)
	30-50% of smallmouth over 14 inches	Somewhat lower than targets for other notable smallmouth lakes in the area	7-33% over 14 inches (2 surveys)
Black Crappie	15-40% over 10 inches	Somewhat lower than targets for other area lakes, based on expected slower growth	5% over 10 inches (1 survey)
Bluegill	5-15% over 7 inches	Lower than targets for other area lakes, based on expected slower growth	0-7% over 7 inches (2 surveys)
Northern Pike	10-20% over 28 inches	Similar to targets for other area lakes where pike are not native and a low density population is desired	3% over 28 inches (1 survey)

APPENDIX B

Appendix B shows the results of stakeholders input on the fisheries of the Spider Chain in Sawyer County.

Virtual Visioning Session
Date: Jan. 12, 2022
Time: 6 p.m. to 8 p.m.
Place: Zoom
Facilitators: Max Wolter (DNR), Scott Braden (DNR), Evan Sniadajewski (DNR)
Technical Advisors: Scott Braden (DNR), Evan Sniadajewski (DNR)
Profile of 24 Participants (more than one affiliation possible per person):

Lakeside Landowners – 19
Area Anglers – 3 (people who fish on these lakes but do not own property on them)
Fishing Guides – 2
Business Owners – 1

Online Preference and Input Survey
Survey Host: SurveyMonkey (https://www.surveymonkey.com/r/SpiderChainFMP)
Survey Open Period: January 13 – February 14, 2022
Profile of 114 Participants (more than one affiliation possible per person):

Lakeside Landowners – 84
Area Anglers – (people who fish on these lakes but do not own property on them) -14
Fishing Guides – 3
Others (including non-anglers) – 16

Table B1. *Levels of sport fishing interest among stakeholders for fish species in the Spider Chain. Weighted Score is calculated for each species as: (# high interest responses x 3) + (# moderate interest responses x 2) + (# low interest responses) / total stakeholders providing feedback. If a stakeholder chose not to provide feedback for a given species their interest level was considered to be none.*

Fish Species Nominated	Level of Participant Fishing Interest: *in-person + online = total*				Weighted Score
	High	Medium	Low	None	
Muskellunge	80	13	9	5	**2.57**
Walleye	56	36	8	7	**2.32**
Smallmouth Bass	50	33	12	8	**2.21**
Largemouth Bass	52	29	10	12	**2.17**
Black Crappie	31	37	21	17	**1.77**
Bluegill	11	33	41	20	**1.33**
Yellow Perch	10	34	35	24	**1.29**
Northern Pike	6	12	31	52	**0.72**

Table B2. *Preferences for numbers versus size and preferences for catch versus harvest among stakeholders for fish species perceived to be most important in the Spider Chain.*

Important Fish Species	Preference for Numbers versus Size *in-person + online* **= *total***			Preference for Catch-and-Release versus Harvest *in-person + online* **= *total***		
	Emphasis on Number over Size	Prefer Balance	Emphasis on Size over Number	Emphasis on Catch and Release	Prefer Balance	Emphasis on Maximum Sustainable Harvest
Muskellunge	15	39	49	98	5	4
Walleye	21	74	12	16	68	25
Smallmouth Bass	13	58	31	76	21	6
Largemouth Bass	13	64	25	60	26	19
Black Crappie	22	68	14	17	49	36
Bluegill	29	55	18	23	40	33
Yellow Perch	27	58	12	22	44	33
Northern Pike	2	23	55	13	13	76

APPENDIX C

Appendix C summarizes available stocking data for the Spider Chain in Sawyer County, going back to the earliest records that were kept. The stocking numbers here reflect a mix of State, Tribal and private funded stocking events.

Table C1. *Stocking history for the Spider Chain in Sawyer County. Additional stocking into North Lake may have been recorded separately. Large fingerling Muskellunge are typically 10-12 inches in length and are stocked in fall. Small fingerling Walleye are typically 1-3 inches in length and are stocked in summer, large fingerling Walleye are 6-8 inches in length and are stocked in fall.*

STOCKING YEAR	SPECIES	NUMBER STOCKED	SIZE	SOURCE (IF AVAILABLE)
1961	Muskellunge	3,326	Large fingerlings	
1962	Walleye	10,000	Small fingerlings	
1963	Muskellunge	3,628	Large fingerlings	
1964	Muskellunge	3,628	Large fingerlings	
1965	Walleye	8,600	Small fingerlings	
1966	White Sucker	2,100	Adult	
1968	White Sucker	10,000	Yearling	
1969	Muskellunge	751	Large fingerlings	
1970	Walleye	8,600	Small fingerlings	
1971	Walleye	12,520	Small fingerlings	
1972	Muskellunge	800	Large fingerlings	Coop ponds
1974	Walleye	25,029	Small fingerlings	Coop ponds
1976	Muskellunge	2,000	Small fingerlings	Coop ponds
1976	Walleye	39,009	Small fingerlings	Private and coop pond
1977	Muskellunge	465	Small fingerlings	DNR Hatchery
1978	Walleye	25,047	Small fingerlings	Private hatchery and coop pond
1980	Walleye	3,300	Large fingerlings	
1981	Walleye	32,020	Small fingerlings	Private hatchery
1981	Walleye	23,030	Large fingerlings	Coop ponds
1983	Walleye	25,674	Small fingerlings	Coop ponds
1984	Muskellunge	200	Large fingerlings	Coop ponds
1985	Walleye	44,000	Small fingerlings	Coop ponds
1987	Walleye	126,420	Small fingerlings	Coop ponds
1989	Walleye	44,154	Small fingerlings	Coop ponds
1991	Walleye	22,464	Small fingerlings	Coop ponds
1991	Muskellunge	200	Large fingerlings	Private hatchery
1992	Walleye	6,210	Small fingerlings	Coop ponds
1993	Walleye	45,283	Small fingerlings	Coop ponds
1995	Walleye	32,715	Small fingerlings	Coop ponds
1997	Walleye	32,715	Small fingerlings	DNR Hatchery

Table C1 continued				
Stocking Year	**Species**	**Number stocked**	**Size**	**Source (if available)**
1999	Walleye	35,000	Small fingerlings	DNR Hatchery
2001	Walleye	20,018	Small fingerlings	DNR Hatchery
2003	Walleye	32,640	Small fingerlings	DNR Hatchery
2004	Walleye	Not available	Large fingerlings	Private hatchery
2005	Walleye	3,501	Large fingerlings	Tribal and private hatchery
2011	Walleye	4,000	Large fingerlings	Private hatchery
2012	Walleye	4,000	Large fingerlings	Private hatchery
2013	Walleye	8,000	Large fingerlings	Private hatchery
2015	Walleye	5,971	Large fingerlings	DNR Hatchery
2019	Walleye	5,972	Large fingerlings	DNR Hatchery
2021	Walleye	20,509	Large fingerlings	Private and DNR hatchery

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